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Q. 1 What is the difference between ROM and PROM?

RAM and ROM both are the primary memory.

ROM or Read-only memory:

is a non-volatile memory. The content or data stored in ROM remains permanently until it is re-written. So it doesn’t depend on power. The data in ROM retains same until it is being altered by a user.

Unlike RAM, CPU can’t access the data directly from the ROM. At first, data gets transferred to the RAM and then CPU can access it. The capacity of ROM is comparatively smaller than RAM. It is also slower and cheaper than RAM. The CPU can only read the data from ROM. CPU can’t write or modified the data stored in ROM.

The ROM is mainly used for storing some instruction that the computer requires at the time of booting. So, if you don’t know about booting then it is a self-starting process where the necessary programs are loaded into the computer memory after power on or restart. It is generally used to store firmware data like BIOS for the hardware which are normally written in ROM at the time of manufacturing of the computer.

# PROM - programmable read-only memory:

PROM stands from Programmable Read Only Memory is a type of Read only Memory (ROM). It is a type of memory which can only be modified once not again and again. Using PROM a user is allowed to write a short programs using special machine known as *PROM Programmer.* PROM Programmer supply current to the specific cells in Read Only Memory which can easily blow a fuse in them. The whole process is known as burning PROM. Most of the ROM Chips are designed to be modified so, there are less chances of any type of error. Users can modify it by using EPROM or EEPROM.

## **Major difference between PROM and ROM:**

ROM:-

1)Non-programmable.

2)Not flexible (because data can't be changed.

3)It is comparatively slower.

4)Economical only when produced in large volumes.

5)Used in PC's.

6)Writing of cell contains mainly done by 'masking; mechanisms.

PROM:-

1)Programmable.

2)Flexible(Field-Programmable i.e. can be programmed in any place of work).

3)It is comparatively faster.

4)Economical even when produced in small volume.

5)Mainly used for research and development purpose.

6) Mainly done electrically.

Q. 2 Explain the principle of the EPROM and EEPROM. State the difference between two.

# EPROM

EPROM (UV Erasable Programmable Read Only Memory) is a special type of ROM that is programmed electrically and yet is erasable under UV light. The EPROM device is programmed by forcing an electrical charge on a small piece of polysilicon material (called the floating gate) located in the memory cell. When this charge is present on this gate, the cell is “programmed,” usually a logic “0,” and when this charge is not present, it is a logic “1.” The floating gate is where the electrical charge is stored.

Prior to being programmed, an EPROM has to be erased. To erase the EPROM, it is exposed to an ultraviolet light for approximately 20 minutes through a quartz window in its ceramic package. After erasure, new information can be programmed to the EPROM. After writing the data to the EPROM, an opaque label has to be placed over the quartz window to prevent accidental erasure. Programming is accomplished through a phenomenon called hot electron injection. High voltages are applied to the select gate and drain connections of the cell transistor. The select gate of the transistor is pulsed “on” causing a large drain current to flow. The large bias voltage on the gate connection attracts electrons that penetrate the thin gate oxide and are stored on the floating gate.

# EEPROM

EEPROM (Electrically Erasable Programmable ROM) offer users excellent capabilities and performance. Only one external power supply is required since the high voltage for program/erase is internally generated. Write and erase operations are performed on a byte per byte basis. The EEPROM uses the same principle as the UV-EPROM. Electrons trapped in a floating gate will modify the characteristics of the cell, and so a logic “0” or a logic “1” will be stored. The EEPROM is the memory device that implements the fewest standards in cell design. The more common cell is composed of two transistors. The storage transistor has a floating gate (similar to the EPROM storage transistor) that will trap electrons. In addition, there is an access transistor, which is required for operations. Figure 9-10 shows the voltages applied on the memory cell to program/erase a cell. Note that an EPROM cell is erased when electrons are removed from the floating gate and that the EEPROM cell is erased when the electrons are trapped in the floating cell. To have products electrically compatible, the logic path of both types of product will give a “1” for erase state and a “0” for a programmed state. Figure 9-11 shows the electrical differences between EPROM and EEPROM cells.

| **S.NO** | **EPROM** | **EEPROM** |
| --- | --- | --- |
| 1. | In EPROM, UV light is used to erase the EPROM’s content. | In EEPROM, electric signal is used to erase the EEPROM’s contents. |
| 2. | EPROM includes a rock crystal crystal window at the top. | EEPROM area unit wholly sheathed in an opaque plastic case. |
| 3. | Relative size of cell in EPROM is one. | The relative size of cell in EEPROM is 3. |
| 4. | EPROM is modern version of PROM. | EEPROM is the modern version of EPROM. |
| 5. | EPROM is the external programming. | EEPROM is the external programming. |
| 6. | Once EPROM memory is erased then it can be reprogrammed. | EEPROM is also reprogrammed after erasing like EPROM. |
| 7. | The transistor used in EPROM consumes 12.5 volt. | The transistor used in EEPROM consumes 5 volt. |
| 8. | In EPROM, hot electron injection programming technique is used. | In EEPROM, tunnel effect is used as programming technique. |
| 9. | In EPROM, an erasure consumes 15 to 20 minute for erasing contents. | In EEPROM, an erasure consumes 5 millisecond time for erasing contents. |
| 10. | EPROM chip has got to be off from the computer circuit to erase and reprogram the computer’s BIOS. | EEEPROM chip will be erased and reprogrammed within the electrical circuit to erase and reprogram the content of computer’s BIOS |